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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/773,872	02/02/2001	Richard Bullock	ESM00-001	7976

7590 06/26/2002

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EXAMINER

BOOTH, RICHARD A

ART UNIT	PAPER NUMBER
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2812

DATE MAILED: 06/26/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/773,872

Applicant(s)

BULLOCK ET AL.

Examiner

Richard A. Booth

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) ____ is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☐ Claim(s) ____ is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

Claims 16 is rejected under 35 U.S.C. 102(e) as being anticipated by Miyasaka, U.S. Patent 6,124,154.

Miyasaka shows the invention as claimed including providing said insulating substrate; forming an active semiconductor layer on said insulating substrate; thermally depositing a silicon oxide gate dielectric layer on said active semiconductor layer, using TEOS (see col. 17-lines 17-33); and performing an anneal procedure to densify said silicon oxide gate dielectric layer (see Fig. 1 and col 15-line 15 to col. 18-line 2).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huang et al., U.S. Patent 6,037,199 in view of Doklan et al., U.S. Patent 4,851,370.

Huang et al. shows the invention substantially as claimed including an insulating substrate 1; an active semiconductor layer of polysilicon 5 with a thickness of 300-1000 angstroms (see col. 3-lines 6-28); forming a gate dielectric layer 9 on said active semiconductor layer; depositing a second polysilicon layer 10 on said gate dielectric; patterning said gate electrode and gate dielectric layer (see Figs. 6-7); and forming a source/drain region 11 in a portion of said polysilicon layer not covered by said polysilicon gate structure (see Figures 1-7 and column 2-line 51 to column 4-line 33).

Huang et al. lacks anticipation of forming a composite gate dielectric layer comprising a first thermally grown oxide layer, followed by an annealing process, a second thermally deposited oxide layer using a TEOS source, and a second subsequent anneal.

Doklan et al. discloses forming a composite gate dielectric structure on a silicon substrate 1 using a first thermally grown oxide layer 3 of fifty angstroms followed by a subsequent thermal deposition of an oxide layer 5 using a TEOS source (see col. 3-line 63 to col. 4-line 7). Note that a first anneal is performed after the thermally grown layer 3 is formed in an argon atmosphere and a second subsequent anneal was used after formation of the TEOS based layer to densify the oxide (see col. 8-lines 8-14). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the primary reference of Huang et al. so as to

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incorporate the composite gate dielectric of Doklan et al. because this results in a gate dielectric with low defect density (see abstract).

With respect to processing parameters such as the thicknesses of layers and conditions of oxidations and anneals, the examiner takes official notice that these parameters in the claims are typical well known processing conditions suitable, for example, to form thermal dielectrics or for oxide densification.

Claims 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyasaka, U.S. Patent 6,124,154.

Miyasaka, U.S. Patent 6,124,154 is applied as above but lacks anticipation of specific processing conditions with respect to the polysilicon layer and the thermal oxidation and densification processes. In response, the examiner takes official notice that these parameters are typical well known processing conditions suitable, for example, to form thermal dielectrics or for oxide densification.


Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure and shows the state of the art in TFT and gate dielectric technology.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard A. Booth whose telephone number is 308-3446. The examiner can normally be reached on Monday-Thursday from 7:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on 308-3325. The fax phone numbers for the organization where this application or proceeding is assigned are 308-7724 for regular communications and 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 308-1782.



Richard A. Booth
Primary Examiner
Art Unit 2812

June 21, 2002